

## SEQUENCE LISTING

<110> Lin, Yi-Jyun  
 Benzer, Seymour  
 California Institute of Technology

<120> METHUSELAH GENE, COMPOSITIONS AND  
 METHODS OF USE

<130> 06618/343001

<140> 09/370,098

<141> 1999-08-06

<150> 60/095,826

<151> 1998-08-07

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aaaaaagca taa atg aaa act ctt ttg gtt ctt cgg ata tca act gtc ata	171

\* Met Lys Thr Leu Leu Val Leu Arg Ile Ser Thr Val Ile

1

5

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ctt gtt gtg ctg gtt att caa aaa tca tat gca gac att ctc gaa tgc	219
Leu Val Val Leu Val Ile Gln Lys Ser Tyr Ala Asp Ile Leu Glu Cys	
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gat tat ttc gac act gtc gat att tcg gca gct caa aaa cta cag aat	267
Asp Tyr Phe Asp Thr Val Asp Ile Ser Ala Ala Gln Lys Leu Gln Asn	
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gga tcg tac tta ttt gag ggg ttg ctc gtt ccg gcc att ttg acg gga	315
Gly Ser Tyr Leu Phe Glu Gly Leu Leu Val Pro Ala Ile Leu Thr Gly	
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gaa tat gac ttt agg att ctc ccg gac gac tcg aag cag aag gtg gct	363
Glu Tyr Asp Phe Arg Ile Leu Pro Asp Ser Lys Gln Lys Val Ala	
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Arg His Ile Arg Gly Cys Val Cys Lys Leu Lys Pro Cys Val Arg Phe	
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tgc tgc cct cac gac cat atc atg gat aat ggt gtc tgc tac gac aac	459
Cys Cys Pro His Asp His Ile Met Asp Asn Gly Val Cys Tyr Asp Asn	
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Met Ser Asp Glu Glu Leu Ala Glu Leu Asp Pro Phe Leu Asn Val Thr	
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ctt gac gac ggg tcg gtg tcc cgc aga cac ttt aaa aac gaa cta atc	555
Leu Asp Asp Gly Ser Val Ser Arg Arg His Phe Lys Asn Glu Leu Ile	
130 135 140	
gtc cag tgg gac cta ccg atg ccg tgt gac gga atg ttc tac cta gac	603
Val Gln Trp Asp Leu Pro Met Pro Cys Asp Gly Met Phe Tyr Leu Asp	
145 150 155	
aac cgc gaa gaa cag gat aag tac acg ttg ttc gag aac gga act ttc	651
Asn Arg Glu Glu Gln Asp Lys Tyr Thr Leu Phe Glu Asn Gly Thr Phe	
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Phe Arg His Phe Asp Arg Val Thr Leu Arg Lys Arg Glu Tyr Cys Leu	
175 180 185	
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Gln His Leu Thr Phe Ala Asp Gly Asn Ala Thr Ser Ile Arg Ile Ala	
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cct cac aac tgt ttg ata gtg cca tca att acc ggt cag acg gtt gtg	795
Pro His Asn Cys Leu Ile Val Pro Ser Ile Thr Gly Gln Thr Val Val	
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Met Ile Ser Ser Leu Ile Cys Met Val Leu Thr Ile Ala Val Tyr Leu	
225 230 235	
ttc gtc aag aaa cta caa aac ttg cat gga aaa tgc ttc atc tgc tac	891
Phe Val Lys Lys Leu Gln Asn Leu His Gly Lys Cys Phe Ile Cys Tyr	
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Met Val Cys Leu Phe Met Gly Tyr Leu Phe Leu Leu Leu Asp Leu Trp	
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Gln Ile Ser Ile Ser Phe Cys Lys Pro Ala Gly Phe Leu Gly Tyr Phe	
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Phe Val Met Ala Ala Phe Phe Trp Leu Ser Val Ile Ser Leu His Leu	
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Trp Asn Thr Phe Arg Gly Ser Ser His Lys Ala Asn Arg Phe Leu Phe	
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Glu His Arg Phe Leu Ala Tyr Asn Thr Tyr Ala Trp Gly Met Ala Val	
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Val Leu Thr Gly Ile Thr Val Leu Ala Asp Asn Ile Val Glu Asn Gln	
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Gln Ala Trp Ser Ala Met Leu Tyr Phe Tyr Gly Pro Met Val Phe Leu	
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att gcc ttt aac ata acc atg ttc atc ctg acg gct aag cgt ata tta	1323
Ile Ala Phe Asn Ile Thr Met Phe Ile Leu Thr Ala Lys Arg Ile Leu	
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Gly Val Lys Lys Asp Ile Gln Asn Phe Ala His Arg Gln Glu Arg Lys	
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Gln Lys Leu Asn Ser Asp Lys Gln Thr Tyr Thr Phe Phe Leu Arg Leu	
415 420 425	
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Phe Ile Ile Met Gly Leu Ser Trp Ser Leu Glu Ile Gly Ser Tyr Phe	
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Ser Gln Ser Asn Gln Thr Trp Ala Asn Val Phe Leu Val Ala Asp Tyr	
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Leu Asn Trp Ser Gln Gly Ile Ile Ile Phe Ile Leu Phe Val Leu Lys	
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Arg Ser Thr Trp Arg Leu Leu Gln Glu Ser Ile Arg Gly Glu Gly Glu	
480 485 490	
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Glu Val Asn Asn Ser Glu Glu Glu Ile Ser Leu Glu Asn Thr Thr Thr	
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Arg Asn Val Leu Leu *	
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cataaataac ggtttctgta tatcactttt cttaaaacta ttcaactaac tcagatggat	1889
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Asp Thr Val Asp Ile Ser Ala Ala Gln Lys Leu Gln Asn Gly Ser Tyr	

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Arg	Gly	Cys	Val	Cys	Lys	Leu	Lys	Pro	Cys	Val	Arg	Phe	Cys	Cys	Pro	
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His	Asp	His	Ile	Met	Asp	Asn	Gly	Val	Cys	Tyr	Asp	Asn	Met	Ser	Asp	
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Gly	Ser	Val	Ser	Arg	Arg	His	Phe	Lys	Asn	Glu	Leu	Ile	Val	Gln	Trp	
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Glu	Gln	Asp	Lys	Tyr	Thr	Leu	Phe	Glu	Asn	Gly	Thr	Phe	Phe	Arg	His	
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Phe	Asp	Arg	Val	Thr	Leu	Arg	Lys	Arg	Glu	Tyr	Cys	Leu	Gln	His	Leu	
			180					185					190			
Thr	Phe	Ala	Asp	Gly	Asn	Ala	Thr	Ser	Ile	Arg	Ile	Ala	Pro	His	Asn	
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Cys	Leu	Ile	Val	Pro	Ser	Ile	Thr	Gly	Gln	Thr	Val	Val	Met	Ile	Ser	
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Ser	Leu	Ile	Cys	Met	Val	Leu	Thr	Ile	Ala	Val	Tyr	Leu	Phe	Val	Lys	
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Lys	Leu	Gln	Asn	Leu	His	Gly	Lys	Cys	Phe	Ile	Cys	Tyr	Met	Val	Cys	
			245						250					255		
Leu	Phe	Met	Gly	Tyr	Leu	Phe	Leu	Leu	Leu	Asp	Leu	Trp	Gln	Ile	Ser	
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Ile	Ser	Phe	Cys	Lys	Pro	Ala	Gly	Phe	Leu	Gly	Tyr	Phe	Phe	Val	Met	
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Ala	Ala	Phe	Phe	Trp	Leu	Ser	Val	Ile	Ser	Leu	His	Leu	Trp	Asn	Thr	
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Phe	Arg	Gly	Ser	Ser	His	Lys	Ala	Asn	Arg	Phe	Leu	Phe	Glu	His	Arg	
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Gly	Ile	Thr	Val	Leu	Ala	Asp	Asn	Ile	Val	Glu	Asn	Gln	Asp	Trp	Asn	
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Ser	Ala	Met	Leu	Tyr	Phe	Tyr	Gly	Pro	Met	Val	Phe	Leu	Ile	Ala	Phe	
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 Lys Lys Leu Gln Asn Leu His Gly Lys Cys Phe Ile Cys Tyr Met Val  
 35 40 45  
 Cys Leu Phe Met Gly Tyr Leu Phe Leu Leu Leu Asp Leu Trp Gln Ile  
 50 55 60  
 Ser Ile Ser Phe Cys Lys Pro Ala Gly Phe Leu Gly Tyr Phe Phe Val  
 65 70 75 80  
 Met Ala Ala Phe Phe Trp Leu Ser Val Ile Ser Leu His Leu Trp Asn  
 85 90 95  
 Thr Phe Arg Gly Ser Ser His Lys Ala Asn Arg Phe Leu Phe Glu His  
 100 105 110  
 Arg Phe Leu Ala Tyr Asn Thr Tyr Ala Trp Gly Met Ala Val Val Leu  
 115 120 125  
 Thr Gly Ile Thr Val Leu Ala Asp Asn Ile Val Glu Asn Gln Asp Trp  
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 Asn Pro Arg Val Gly His Glu Gly His Cys Trp Ile Tyr Thr Gln Ala  
 145 150 155 160  
 Trp Ser Ala Met Leu Tyr Phe Tyr Gly Pro Met Val Phe Leu Ile Ala  
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 Phe Asn Ile Thr Met Phe Ile Leu Thr Ala Lys Arg Ile Leu Gly Val  
 180 185 190  
 Lys Lys Asp Ile Gln Asn Phe Ala His Arg Gln Glu Arg Lys Gln Lys  
 195 200 205  
 Leu Asn Ser Asp Lys Gln Thr Tyr Thr Phe Phe Leu Arg Leu Phe Ile  
 210 215 220  
 Ile Met Gly Leu Ser Trp Ser Leu Glu Ile Gly Ser Tyr Phe Ser Gln  
 225 230 235 240  
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 Gly Gln Val Gly Leu Arg Cys Arg Leu Val Ala Gly Leu Leu His Tyr  
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 Cys Gly Leu Ala Ala Gly Cys Trp Met Ser Leu Glu Gly Leu Glu Leu  
 65 70 75 80  
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 Trp Leu Cys Leu Ile Gly Tyr Gly Val Pro Leu Leu Ile Val Gly Val

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100 105 110  
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 115 120 125  
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 130 135 140  
 Phe Ile Ile Leu Cys Asn Ala Val Ile Phe Val Thr Thr Val Trp Lys  
 145 150 155 160  
 Leu Thr Gln Lys Phe Ser Glu Ile Asn Pro Asp Met Lys Lys Leu Lys  
 165 170 175  
 Lys Ala Arg Ala Leu Thr Ile Thr Ala Ile Ala Gln Leu Phe Leu Leu  
 180 185 190  
 Gly Cys Thr Trp Val Phe Gly Leu Phe Ile Phe Asp Asp Arg Ser Leu  
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 Leu Gln Thr Asp Arg Asn Thr Ile His Lys Asn Leu Cys Ile Asn Leu  
 35 40 45  
 Phe Leu Ala Glu Leu Leu Phe Leu Val Gly Ile Asp Lys Thr Gln Tyr  
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 Glu Val Ala Cys Pro Ile Phe Ala Gly Leu Leu His Tyr Phe Phe Leu  
 65 70 75 80  
 Ala Ala Phe Ser Trp Leu Cys Leu Glu Gly Val His Leu Tyr Leu Leu  
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 Leu Val Glu Val Phe Glu Ser Glu Tyr Ser Arg Thr Lys Tyr Tyr Tyr  
 100 105 110  
 Leu Gly Gly Tyr Cys Phe Pro Ala Leu Val Val Gly Ile Ala Ala Ala  
 115 120 125  
 Ile Asp Tyr Arg Ser Tyr Gly Thr Glu Lys Ala Cys Trp Leu Arg Val  
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 Asp Asn Tyr Phe Ile Trp Ser Phe Ile Gly Pro Val Ser Phe Val Ile  
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 Val Val Asn Leu Val Phe Leu Met Val Thr Leu His Lys Met Ile Arg  
 165 170 175  
 Ser Ser Ser Val Leu Lys Pro Asp Ser Ser Arg Leu Asp Asn Ile Lys  
 180 185 190  
 Ser Trp Ala Leu Gly Ala Ile Ala Leu Leu Phe Leu Leu Gly Leu Thr  
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Val	Cys	Leu	Phe	Leu	Ala	Lys	Ile	Leu	Phe	Leu	Thr	Gly	Ile	Asp	Lys
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Phe	Met	Val	Arg	Asn	Leu	Lys	Val	Val	Asn	Tyr	Phe	Ser	Ser	Arg	Asn
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Ile	Lys	Met	Leu	His	Leu	Cys	Ala	Phe	Gly	Tyr	Gly	Leu	Pro	Val	Leu
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Val	Val	Ile	Ile	Ser	Ala	Ser	Val	Gln	Pro	Arg	Gly	Tyr	Gly	Met	His
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Ser	Lys	Leu	Lys	Asp	Thr	Arg	Leu	Leu	Thr	Phe	Lys	Ala	Ile	Ala	Gln
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225					230					235					

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